

Amendments to the Claims:

This listing of the claims will replace all prior versions and listings of claims in the application.

Listings of Claims:

1. (Currently Amended) A magnetic detecting element comprising:

a multilayer film comprising a laminate of a free magnetic layer, a nonmagnetic material layer, a pinned magnetic layer and an antiferromagnetic layer; wherein a current flows perpendicularly to a film plane of each of the layers of the multilayer film, and the free magnetic layer comprises a plurality of soft magnetic layers which are laminated ~~through~~ with a current limiting layer disposed therebetween, the current limiting layer comprising ~~containing~~ an insulating portion and a conductive portion;

wherein the insulating portion of the current limiting layer comprises an insulating material film having a plurality of holes extending from a top to a bottom of the current limiting layer, the holes being filled with a conductive material film serving as the conductive portion; and

wherein the holes have an opening ratio in the current limiting layer of from about 10% to 30%.

2. (Currently Amended) A magnetic detecting element comprising:

a multilayer film comprising an upper nonmagnetic material layer, an upper pinned magnetic layer and an upper antiferromagnetic layer, which are laminated above a free magnetic layer, and a lower nonmagnetic material layer, a lower pinned magnetic layer and a lower antiferromagnetic layer, which are laminated below the free magnetic layer;

wherein a current flows perpendicularly to a film plane of each of the layers of the multilayer film, and the free magnetic layer comprises a plurality of soft magnetic layers which are laminated ~~through~~ with a current limiting layer disposed therebetween, the current limiting layer comprising ~~containing~~ an insulating portion and a conductive portion;

wherein the insulating portion of the current limiting layer comprises an insulating material film having a plurality of holes extending from a top to a bottom of the current limiting layer, the holes being filled with a conductive material film serving as the conductive portion; and

wherein the holes have an opening ratio in the current limiting layer of from about 10% to 30%.

3. (Previously Presented) A magnetic detecting element according to claim 1 or 2, further comprising hard bias layers formed on both sides of the free magnetic layer in a track width direction, for aligning magnetization of the free magnetic layer.

4. (Previously Presented) A magnetic detecting element according to claim 1, further comprising an in-stack bias layer laminated at least one of above and below the free magnetic layer, for aligning magnetization of the free magnetic layer.

5. (Currently amended) A magnetic detecting element according to claim 1, wherein magnetizations of the plurality of soft magnetic layers are parallel to each other.

6. (Currently amended) A magnetic detecting element according to claim 5, wherein the plurality of soft magnetic layers are ferromagnetically coupled with each other through the current limiting layer.

7. (Currently amended) A magnetic detecting element according to claim 1, wherein magnetizations of the plurality of the soft magnetic layers are antiparallel to each other.

8. (Currently amended) A magnetic detecting element according to claim 1, wherein the plurality of the soft magnetic layers constituting the free magnetic layer have a same magnetic moment per unit area.

9. (Currently amended) A magnetic detecting element according to claim 1, wherein the plurality of the soft magnetic layers constituting the free magnetic layer have different magnetic moments per unit area.

10. (Currently amended) A magnetic detecting element according to claim 1, wherein the plurality of the soft magnetic layers constituting the free magnetic layer have a same thickness.

11. (Currently amended) A magnetic detecting element according to claim 1, wherein the plurality of the soft magnetic layers constituting the free magnetic layer have different thicknesses.

12. (Original) A magnetic detecting element according to claim 7, wherein the free magnetic layer comprises a nonmagnetic intermediate layer composed of at least one nonmagnetic material of Ru, Rh, Ir, Os, Re, Cr, and Cu.

13-23. (Cancelled)

24. (Currently amended) A method of manufacturing a magnetic detecting element comprising the steps of:

(a) laminating a first electrode layer, an antiferromagnetic layer, a pinned magnetic layer, a nonmagnetic material layer, a first soft magnetic layer constituting a free magnetic layer, and a current limiting layer containing an insulating portion and a conductive portion in that order from below;

(b) laminating a second soft magnetic layer constituting the free magnetic layer on the current limiting layer; and

(c) laminating a second electrode layer,

wherein the insulating portion of the current limiting layer comprises an insulating material film having a plurality of holes extending from a top to a bottom of the current limiting layer, the holes being filled with a conductive material film serving as the conductive portion.

wherein the holes have an opening ratio in the current limiting layer of from about 10% to 30%, and the first and second magnetic layers constituting the free magnetic layer are ferromagnetically coupled with each other through the current limiting layer.

25. (Cancelled)

26. (Currently amended) A method of manufacturing a magnetic detecting element according to claim 24, wherein the first and second soft magnetic layers constituting the free magnetic layer preferably have a same magnetic moment per unit area.

27. (Currently amended) A method of manufacturing a magnetic detecting element according to claim 24, wherein the first and second soft magnetic layers constituting the free magnetic layer have different magnetic moments per unit area.

28. (Currently amended) A method of manufacturing a magnetic detecting element according to claim 24, wherein the first and second soft magnetic layers constituting the free magnetic layer preferably have a same thickness.

29. (Currently amended) A method of manufacturing a magnetic detecting element according to claim 24, wherein the first and second soft magnetic layers constituting the free magnetic layer have different thicknesses.

30. (Original) A method of manufacturing a magnetic detecting element according to claim 24, further comprising, between the steps (b) and (c), (d) a step of laminating a nonmagnetic material layer, a pinned magnetic layer and an antiferromagnetic layer on the free magnetic layer.

31. – 41. (Cancelled)

42. (Previously Presented) A magnetic detecting element according to claim 2, further comprising an in-stack bias layer laminated at least one of above and below the free magnetic layer, for aligning magnetization of the free magnetic layer.

43. (New) A magnetic detecting element according to claim 1 or 2, wherein the conductive portion of the current limiting layer comprises conductive particles, and a thickness of the current limiting layer is smaller than a particle size of the conductive particles.

44. (New) A magnetic detecting element according to claim 1 or 2, wherein the conductive portion of the current limiting layer comprises crystal grains and the insulating portion comprises an amorphous material.

45. (New) A magnetic detecting element according to claim 44, wherein the crystal grains comprise at least one element selected from the group consisting of Fe, Ru, Pt, Au, Rh, Ir, Pd, Os, Re, Cu, and Ag, and the amorphous material comprises an O or N compound with at least one element selected from Al, Co, Ti, Zr, Hf, Nb, Ta, Mo, W, and the rare earth elements.

46. (New) A magnetic detecting element according to claim 1 or 2, wherein the free magnetic layer comprises at least three soft magnetic layers which are laminated with the current limiting layer disposed therebetween.

47. (New) A magnetic detecting element comprising:
a multilayer film comprising a laminate of a free magnetic layer, a nonmagnetic material layer, a pinned magnetic layer and an antiferromagnetic layer; wherein a current flows perpendicularly to a film plane of each of the layers of the multilayer film, and the free magnetic layer comprises at least three soft magnetic layers which are laminated with a current limiting layer disposed therebetween, the current limiting layer comprising an insulating portion and a conductive portion;

wherein the insulating portion of the current limiting layer comprises an insulating material film having a plurality of holes extending from a top to a bottom of the current limiting layer, the holes being filled with a conductive material film serving as the conductive portion.

48. (New) A magnetic detecting element comprising:

a multilayer film comprising an upper nonmagnetic material layer, an upper pinned magnetic layer and an upper antiferromagnetic layer, which are laminated above a free magnetic layer, and a lower nonmagnetic material layer, a lower pinned magnetic layer and a lower antiferromagnetic layer, which are laminated below the free magnetic layer;

wherein a current flows perpendicularly to a film plane of each of the layers of the multilayer film, and the free magnetic layer comprises at least three soft magnetic layers which are laminated with a current limiting layer provided therebetween, the current limiting layer comprising an insulating portion and a conductive portion;

wherein the insulating portion of the current limiting layer comprises an insulating material film having a plurality of holes extending from a top to a bottom of the current limiting layer, the holes being filled with a conductive material film serving as the conductive portion.